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ABSTRACT

Described are over 70 activities designed to help students develop writing skills by examining energy issues. Intended for middle school students, the lessons were developed by Hardee County, Florida teachers. Learning strategies employed include class discussions, analogies, word puzzles, letter writing, sentence completions, vocabulary building challenges, and related writing assignments. A list of energy information sources is appended. (WB)

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INTRODUCTION

Florida's energy supply outlook is critically dependent upon foreign oil and the stability and supply of the international oil market. The State's dependence on oil is likely to remain high for at least the next ten to fifteen years, assuming that the United States can maintain access to eastern hemisphere oil supplies. The general long-term trend is clear: non-renewable resources, especially oil and natural gas, are declining in quality and quantity. A variety of alternative sources and strategies must be developed as rapidly as possible.

Most of Florida's energy is provided by the two fuels in shortest supply and those which are experiencing the steepest increase in price--oil and natural gas. Since 1970, oil has consistently supplied approximately 70 percent of the State's energy. The percentage of natural gas supplied decreased from 23 percent in 1970 to 15 percent in 1978. Slightly more than 15 percent of the State's energy is provided by other sources. Few states, other than producing states, have such a high degree of petroleum dependency; few states are so vulnerable to the presistently rising price of imported oil. Moreover, Florida's major economic contributors--tourism, construction, agriculture--are energy-intensive industries, largely dependent upon transportation systems that intensify the liquid fuels situation. Under current usage patterns, the Governor's Energy Office estimates a 25 percent shortfall in these fuels by 1990.

There are four alternatives for the solution to Florida's energy problems--to import more oil, to increase the utilization of coal and nuclear resources, to accelerate the development of conservation strategies and technologies, and to develop renewable energy sources. The combination of conservation and renewable energy sources together with the careful utilization of coal and nuclear fuels in the shorter term will enable a viable transition from the State's heavy dependence on oil and gas. If a serious commitment is made to conservation, energy savings ranging from 30 to 49 percent can be achieved. These savings are necessary to reduce the growth in energy demand until renewable energy sources can reach their full potential.

Education is one important route to energy conservation. It involves: 1) getting schools to understand energy problems and issues; 2) getting people to use less energy ("Waste not, want not!"); and 3) getting people to use what energy they do in the most effective ways. Effective energy education depends, in part, upon:

Develop curriculum materials that incorporate energy principles into a variety of academic programs;

Determine characteristics of energy education materials and dissemination procedures effective in favorably changing energy usage characteristics;

Translate technical reports, policies, and guidelines into materials effective in informal and formal energy education programs; and

Determine ways to improve the educational delivery systems (continuing education, inservice training, and extension education) charged with energy education.

The lessons in this booklet by Hardee County teachers are a beginning toward effective energy education. The materials are consistent with County educational programs, State mandates, and the Florida Master Plan for Energy Education.

--Wayne H. Duncan, Director
Tri-County Teacher Education Center

Energy Conceptual Framework: "Big Ideas"

1. Energy is required for the movement or accomplishment of anything.
2. Energy is neither created nor destroyed, but can be converted from one form to another. The means and by-products of conversion are important.
3. The sun is the primary source of energy for the earth.
4. All sources of energy have limitations.
5. Presently, most energy requirements are met through using fossil fuels such as coal, oil, and natural gas; they are limited and are not renewable on any human time scale.
6. Alternative sources of energy such as solar, wind, fission, fusion, biomass, hydro, and geothermal must be considered for development to meet the long-term energy needs of people.
7. The production and use of energy are essential to the maintenance of society.
8. The production, distribution, and use of energy result in environmental and economic consequences.
9. Energy conservation is needed to extend the availability of present energy resources.
10. Values of society affect its use of energy.

QUICK ENERGY THINKING

In this activity the group leaders (or teachers), using small groups, "whip" around to each member of the group asking each person in turn to contribute one short, concise response to the following question: WHAT IS ONE WAY I CAN MAKE A DIFFERENCE IN ENERGY CONSUMPTION IN MY DAILY LIFE? Group members may "pass" and the leader can return to individuals who have trouble thinking of an energy conservation method rapidly.

BRAINSTORMING

Generate a list of things that could be done free or inexpensively, and ways to change energy consumptive attitudes. ** Then, list changes that can be done with a small amount of money. ** Finally, major policy changes and more expensive approaches that could conserve energy.

WHAT DO YOU REALLY value IN YOUR HOME?

1. List 13 of your favorite items around the house which require electricity.
2. Draw a line through the three which you could do without if there were suddenly to be a serious energy problem.
3. Circle the three which mean the most to you and which you would hold onto until the very end.
4. Why did you decide to do without the 3 items?
5. List 5 ways in which this would effect your personal life?
6. Why did you want to keep the other three?
7. List 5 ways in which losing these 3 items would effect your personal life.
8. Using your list of 13 electrical items, list those which could be eliminated without lowering the quality of your life.
9. Briefly the class will discuss what they have learned from the activity.
10. The teacher will ask students the following question: "To conserve electrical consumption in your home, how would you change your present life style?"
11. As the students respond to this question, the teacher will list the ideas on the board.
12. Think about the behaviors the class listed on the board, which ones will you follow? Why?

13. List the behaviors you will not follow. Explain why.

14. Have you changed your mind about any of the behaviors since the beginning of class? Explain.

15. Homework assignment: The students will be asked to interview their parents about decisions on the purchase of major electrical applicances. Is the amount of electricity required a consideration?

ENERGY VISITS

Visit one of the following persons in your community. What kinds of energy do they use in their occupations? What are the tools of their crafts? How would a shortage of usable energy affect their livelihood?

Barber	Carpenter	Fireman
Merchant	Bricklayer	Teacher
Secretary	Bank teller	Policeperson
Bus Driver	Farmer	Dentist
Migrant farm worker	Minister (priest, rabbi)	TV repairperson
Gas station attendant	House painter	Doctor
Car sales person	Grocery store clerk	

I AUTO-SAVE

Given the opportunity to buy your first car, list the energy conservation features you want on your car.

HOME APPLIANCE QUESTIONNAIRE

Directions: Place a check in the first column if you have the appliance in your home. Place a check in the second column if an adult had this appliance in his/her home in 1931. Tally your score and tally the score of the adult. Compile a tally sheet for the entire class. (Also indicate if you have more than one of the appliances.)

	You Have This Applicance	An Adult Had This in 1931
Air conditioner, central		
Battery charger, electric		
Baby bottle warmer		
Beanpot, electric		
Blanket, electric		
Blender		
Broiler, electric, portable		
Can opener, electric		
Coffeemaker, electric		
Comb, electric		
Clock, electric		
Defroster for refrigerator		
Dishwasher		
Disposer, food waste		
Door bell, electric		
Drill, electric		
Dryer, clothes (electric or gas)		
Fan, electric		
Fingernail buffer, electric		
Floor waxer		
Food dryer, dehydrator		
Food warmer tray		
Foot whirlpool, electric		
Freezer, independent unit		
Fryer, deep fat, electric		
Frypan, electric		
Griddle, electric		
Grill, outdoor (electric or gas)		
Guitar, electric		
Hairbrush, electric		
Haircurlers, electric		
Hair curling iron, electric		
Hair dryer, standing or portable		
Hamburger maker, electric		
Heater, room electric		
Heating pad		
Hedge trimmers, electric		
Hot dog cooker, electric		
Humidifier		
Ice cream maker, electric		
Ice crusher, electric		
Intercom		
Iron, regular or steam		

Kiln, ceramic, electric	_____	_____
Knife, electric	_____	_____
Knife, sharpener, electric	_____	_____
Lamp, heat	_____	_____
Lamp, sun	_____	_____
Lawn edger & trimmer, electric	_____	_____
Lawnmower, electric	_____	_____
Lights, indoor night	_____	_____
Lights, indoor wall fixtures	_____	_____
Lights, outdoor lawn	_____	_____
Manicure set, electric	_____	_____
Massager, electric	_____	_____
Mathematical calculator	_____	_____
Mirror, lighted, for makeup	_____	_____
Mixer, electric	_____	_____
Organ, electric	_____	_____
Oven, bun or roll warmer	_____	_____
Oven, dutch, electric	_____	_____
Oven, microwave	_____	_____
Oven, portable	_____	_____
Oven, toaster	_____	_____
Peeling wand, electric	_____	_____
Pencil sharpener, electric	_____	_____
Pizza maker, electric	_____	_____
Popcorn popper, electric	_____	_____
Projector, movie	_____	_____
Projector, slide	_____	_____
Radio, clock	_____	_____
Radio, standard	_____	_____
Range, kitchen, electric or gas	_____	_____
Razor, electric	_____	_____
Record player	_____	_____
Refrigerator	_____	_____
Rug shampooer	_____	_____
Sander, electric	_____	_____
Saw, electric	_____	_____
Scissors, electric	_____	_____
Sewing machine	_____	_____
Shoe polisher, electric	_____	_____
Slow cooker, electric	_____	_____
Soldering kit, electric	_____	_____
Tape recorder, electric	_____	_____
Television	_____	_____
Thermostate (Oil or Gas Heat)	_____	_____
Toaster	_____	_____
Toothbrush, electric	_____	_____
Train set, electric	_____	_____
Typewriter, electric	_____	_____
Vacuum cleaner	_____	_____
Vaporizer	_____	_____
Waffle Iron	_____	_____
Washer, clothes	_____	_____
Water heater (electric or gas)	_____	_____

Water pik	_____	_____
Wok, electric	_____	_____
Woodburning set, electric	_____	_____
Yogurt maker, electric	_____	_____
Other, (List)	_____	_____

Adapted from article "Energy Questionnaire", Journal of Home Economics, 65 (Dec., 1973) 34-35.

GENERATING ANALOGIES

1. Paying two dollars a gallon for gasoline is like _____.
2. Turning off the air conditioner on a hot summer day is like _____.
3. Building a solar hot water heater for your roof is like _____.
4. Listening to "SAVE ENERGY" messages on TV is like _____.
5. Nuclear energy is to the energy crisis as _____ is to _____.
6. Heating and high fuel oil bills are to the North in winter what _____ _____ is to South Florida in the summer.
7. Gasoline costs are to cars what _____ is to home air conditioning.
8. Driving big cars fast is to gasoline waste what _____ is to electricity waste.
9. Shining your shoes with your cashmere coat is like burning _____ to make electricity.
10. Growing corn to make gasohol in a starving world is like _____.
11. Our cars are to our life styles as _____.
12. Keeping your thermostat at 68° F in winter is like driving your car at _____ miles per hour.
13. A leaky faucet is to drought as a hole in your gas tank is to _____.
14. Parking used gum in your neighbor's chair is like nuclear waste in _____.
15. Weather stripping is to windows, as _____ is to attics.
16. Weather stripping is to doors, as _____ is to cracks.
17. A clogged filter in your air conditioner is like trying to breathe with _____.
18. Cancer is to human life like _____ is to energy.
19. Legs are to bicycles like the wind is to _____.

TO TELL THE TRUTH . . . .

1. The teacher will read the following out loud to students:

   It's the year 2001 and you live in Wauchula, Florida. In the evenings it is not an uncommon sight to see candles burning brightly in homes, stores, restaurants, and police stations.

   Energy consumption all over the world is at an all-time-low. There's a very <u>limited</u> amount available.

For the past five years the government has established a National Energy Bank to regulate all energy consumption. In each community the government has devised a mechanism that automatically shuts off all electrical power at sunset (except for emergency use, such as hospitals).

2. Next students will silently read this handout:

Dr. Barnes and you are best friends. Dr. Barnes does medical research for the Medical Association in your community. Recently you have found out that he has constructed a fool-proof way to generate electricity in his home. Dr. Barnes feels he must work more on his research each evening. Finishing this reasearch could help him find a cure for cancer.

The local Energy Bank Agency has become aware that extra electrical power is being used in your community. They have sent city officials all over the city to find out who is using the extra electricity!

As you look through your window you see a city official coming to your door. A second later you hear a knock. As you open the door you think to yourself, should I give the city official Dr. Barnes' name?

3. The teacher will ask students the following questions and, after the correct response, the teacher will write it on the overhead projector.

   a. Are there any terms or phrases you do not understand? How about .....?
   b. What are some of the characteristics you need to keep in mind about the central figure?
   c. State the facts of the situation.
   d. What choices do you have?

4. The students will briefly reflect on the situation. The students will be asked to:

   a. Choose an action, and
   b. Write 3 reasons to support their position.

5. Divide the class into two groups, based upon their positions on the issue. Each group will do the following:

   a. List all the reasons they have.
   b. Rank order the reasons, and
   c. Justify their ranking.

6. The class will reconvene into one large circle. A chairperson from each small group will write their position on the board and the 3 best supporting reasons.

7. Class discussion will begin.

a. Students will discuss the merit of one reason over another reason.
b. Students can challenge any of these reasons, defend their own reasons, etc.

8. During the discussion, the teacher will promote the following:

a. Student to student interaction;
b. Keep discussion focused on the issues;
c. Use probing questions to help students examine issues they have ignored or to think about new reasons for a position.

9. The teacher will raise questions to help students relate this issue to the following:

a. Previous experiences,
b. The present rate of consumption of our resources,
c. What alternatives we have,
d. Choosing the alternatives they think are best,
e. Explaining why they are acceptable alternatives,
f. What effect it will have on your life, and
g. The need to prepare yourself and other citizens in working together on energy policies.

WORD SEARCH PUZZLES

ENERGY	OIL	COAL
GAS	SAVE	SUN
FUEL	SOLAR	POWER

S	O	L	A	R	X
A	I	N	U	S	Y
V	L	C	O	A	L
E	N	E	R	G	Y
B	C	O	L	R	Z
P	O	W	E	R	T
U	D	E	U	Q	W
E	F	W	F	A	Z

DEVELOPING VOCABULARY: WORD SCRAMBLES*

Activity One: Read the paragraph and unscramble the words.

What about the days before oil? We burned coal. Many homes in the world still do. A lot of factories do, too. And coal, like oil and gas, is now burned to make electricity. And how did we keep warm before coal? We burned wood.

In fact, all through history we have found ways to keep ourselves warm and dry and to cook our food and to make enough light to see by. We have used many, many sources of energy.

1. i l o ___ ___ ___
2. o a c l ___ ___ ___ ___
3. s g a ___ ___ ___
4. l r i e e t c i c t y ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
5. o w o d ___ ___ ___ ___
6. m r a w ___ ___ ___ ___
7. r d y ___ ___ ___
8. g l i t h ___ ___ ___ ___ ___
9. g e e y n r ___ ___ ___ ___ ___ ___
10. o k o c ___ ___ ___ ___

Activity Two: Read the paragraph and unscramble the words.

Where we turn to get the energy we need is often determined by what we are going to use it for. Food is the obvious source of the energy we need to stay alive, to grow, and to replace worn-out cells and tissues. Coal, oil, or gas provides the energy we need to warm or cool our homes and other buildings. Gasoline or diesel oil provides the energy needed to drive our automobiles, trucks, planes, ships, and trains. Usually electrical energy drives our small motors, operates telephones, radios, TV sets, and other communication systems. Chemical energy in explosives moves things.

1. y e g n r e ___ ___ ___ ___ ___ ___
2. s e l d i e ___ ___ ___ ___ ___ ___
3. r o t o m s ___ ___ ___ ___ ___ ___
4 r e c c i t e a l l ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
5. m e l c h c i a ___ ___ ___ ___ ___ ___ ___ ___
6. o d f o ___ ___ ___ ___
7. a c o l ___ ___ ___ ___

*All paragraphs in this section are taken from What Is Energy? Easy Reader Series, Washington D. C.: U. S. Department of Energy, 1980.

Activity Three: Read the paragraph and unscramble the words.

Energy is never destroyed. It only changes its form. When energy disappears in one form, it pops up at the same time in another form. The opposite is also true. Energy is never made. Whenever we generate heat, for example, we do it only by using up energy in some other form. If we get the heat by burning coal, we are merely changing chemical energy into heat. If we get the heat from an electric broiler, we are changing electrical energy into heat. If we get the heat by rubbing our hands, we are changing motion into heat. The chemical energy, or the electric energy, or the motion already exists before we change them into heat.

1. a l o c ____
2. a t h e ____
3. c r i l e t e c ____
4. a n e g t e r e ____
5. c e m h a l c i ____
6. i n t o m o ____
7. n r u i g b n ____
8. g a h i n c g n ____

Activity Four: Read the paragraph and unscramble the words.

Although energy cannot be destroyed, it can easily be converted into a form such that we cannot use it anymore. In fact, whenever energy is converted, as when it is made to work in a machine, some always escapes.

Think about what happens to the energy a boy puts into a lawn mower when he cuts the grass. The force needed to push the mower ahead comes from muscular energy stored in the boy's leg, arm, and shoulder muscles. By pushing the mower he converts this muscular energy into the mechanical energy of rolling wheels and whirring blades. Most of this energy goes into work against the resisting forces of friction, as the cutters snip off dozens of blades of grass at a time. As each grass blade is cut, it is slightly warmed by the energy that overcame this friction. The whole lawn is thus made a bit warmer than it was before it was cut. But soon this heat escapes into the ground and the air, and the energy has all disappeared. As it still exists somewhere, however, it has merely been lost--not destroyed.

1. a h m i n c e ____
2. o r e f c ____
3. c r l s a u m u ____
4. v r o e t n s c ____
5. c c m n a h a e i l ____
6. o w r k ____
7. e t i g r s s i n ____
8. t r c f i n o i ____
9. h t e a ____

Activity Five: Read the paragraph and unscramble the words.

Each time energy changes from one form to another; a fraction of the energy escapes, never again to be regained or recycled. Supposedly, far, far into the future all of the earth's energy will have escaped

or reached a mysterious condition known as entropy. This idea has extremently important implications. We must realize that the earth's available energy resources are dwindling relentlessly. It is true that the sun is always supplying us with energy. But in the long, long pull, far into the future, it could be that we will have used up all of the energy that has been stored in our fossil fuels, coal, oil, and natural gas. If this happens, only solar energy, atomic or nuclear energy, and the energy in gravitational forces will keep running the giant windup toy that is the earth with all its activities.

1. t c r a f n i o ___ ___ ___ ___ ___ ___ ___ ___
2. c r u o s s e ___ ___ ___ ___ ___ ___ ___
3. u n s ___ ___ ___
4. c o r s e f ___ ___ ___ ___ ___ ___
5. l o r a s ___ ___ ___ ___ ___
6. r u t u f e ___ ___ ___ ___ ___ ___
7. l o s s i f ___ ___ ___ ___ ___ ___
8. c l o m a t ___ ___ ___ ___ ___ ___
9. l e a r u c l ___ ___ ___ ___ ___ ___ ___

Activity Six: Read the paragraph and unscramble the words.

For several reasons it is important to be able to store energy. One good reason is that it can thus be kept for later use. The energy gathered from the wind by a windmill, for instance, can be used only while the wind is blowing, unless it is stored in some way. Another reason is that when energy is stored in matter it can be shipped easily from one place to another. Gasoline, butter, coal and storage batteries are all examples of matter that is valuable mainly because energy is stored in it. So are wound-up clocks, and cylinders full of gas that can be burned. It pays to store as much energy as possible in each pound of matter, in order to avoid carrying too heavy loads of it around.

1. e t t u r b ___ ___ ___ ___ ___ ___
2. d w i n ___ ___ ___ ___
3. e n g y r e ___ ___ ___ ___ ___ ___
4. l i n c y d e r s ___ ___ ___ ___ ___ ___ ___ ___ ___
5. a t i e e b t r s ___ ___ ___ ___ ___ ___ ___ ___ ___
6. l l w n d i m i ___ ___ ___ ___ ___ ___ ___ ___

Activity Seven: Read the paragraph and unscramble the words.

The amount of damage that a moving body can do depends on how much kinetic energy it carries. This, in turn, depends on its weight and its speed. If two bodies of different weights are moving at the same speed, the heavier weight has more kinetic energy than the other. If one is twice as heavy as the other, it carries twice as much energy in its motion. But speed increases the energy of a body faster than weight does. While doubling the weight of a moving body multiplies its kinetic energy by two, doubling its speed multiplies the energy by two times two, or four. Tripling the speed multiplies the energy by three times three, or nine. That is why speeding in an automobile is so dangerous. A car that collides at a speed of 20 miles an hour will do as much damage as a car that falls from a height of 13 feet.

1. i e k t c n i _ _ _ _ _ _ _
2. e w t h g i _ _ _ _ _ _
3. e s e p d _ _ _ _ _
4. m o a b o i u e t l _ _ _ _ _ _ _ _ _ _ _
5. n e g y e r _ _ _ _ _ _
6. a m a g e d _ _ _ _ _ _
7. o t m o i n _ _ _ _ _ _
8. l u p i i m t s e l _ _ _ _ _ _ _ _ _ _
9. c a e s i r s n e _ _ _ _ _ _ _ _ _
10. y e h v a _ _ _ _ _

ANSWERS:

Activity One

1. Oil
2. Coal
3. Gas
4. Electricity
5. Wood
6. Warm
7. Dry
8. Light
9. Energy
10. Cook

Activity Two

1. Energy
2. Diesel
3. Motors
4. Electrical
5. Chemical
6. Food
7. Coal

Activity Three

1. Coal
2. Heat
3. Electric
4. Generate
5. Chemical
6. Motion
7. Burning
8. Changing

Activity Four

1. Machine
2. Force
3. Muscular
4. Converts
5. Mechanical
6. Work
7. Resisting
8. Friction
9. Heat

Activity Five

1. Fraction
2. Sources
3. Sun
4. Forces
5. Solar
6. Future
7. Fossil
8. Atomic
9. Nuclear

Activity Six

1. Butter
2. Wind
3. Energy
4. Cylinders
5. Batteries
6. Windmill

Activity Seven

1. Kinetic
2. Weight
3. Speed
4. Automobile
5. Energy
6. Damage
7. Motion
8. Multiplies
9. Increases
10. Heavy

ENERGY

Words in Context*

Activity One: Write in the missing words.

For several reasons it is important to be able to store energy. One good reason is that it can thus be kept for later use. The energy gathered from the wind by a _____, for instance, can be used only while the wind is _____, unless it is stored in some way.

Although enough energy can be stored in a handful of rubber bands to fly a toy airplane a few hundred feet, millions of tons of _____bands would be needed to store enough _____ to carry a big airplane across the ocean. This load would be so _____that the plane could not fly.

Airplanes and automobiles use gasoline and kerosene because large amounts of _____ energy can be stored in a given weight of these materials. There is as much _____energy in a pound of fuel oil as there is elastic energy in thousands of alarm clock springs fully wound up.

Activity Two: Write in the missing words.

Energy is never destroyed. It only changes its form. When energy disappears in one form, it pops up at the same time in another _____. The opposite is also true. Energy is never made. Whenever we generate heat, for example, we do it only by using up _____in some other form. If we get the heat by burning coal, we are merely changing _____energy into _____. If we get the heat from an electric broiler, we are changing _____ _____ into heat. If we get the heat by rubbing our hands, we are changing _____ into heat. The chemical energy, or the electrical energy, or the motion already exist before we change them into heat.

All the energy we use has to be there already in some form, before we change it and use it. So, to get the _____ we need, we have to find the places where it is hidden by nature....

Activity Three: Write in the missing words.

Today coal can be carried cheaply in ships, if arrangements are made to load and unload them by machine. It can also be sent cheaply overland on a _____, in coal _____ that can be filled from giant hoppers at the coal _____ and unloaded through doors at the bottom that let coal tumble down a chute.

* All quotations are taken from What Is Energy? Easy Reader Series, Washington, D. C.; U. S. Department of Energy, 1980.

Because coal is so cheap, engineers have long wished that they could send it through pipelines as they do _____ and _____. Now they have invented a method of doing this. The coal is ground into a fine _____, and this dust is mixed with liquid to make a soupy substance called a slurry, which can be _____ through pipes. When the _____ is to be burned it is allowed to settle out of the _____, separating from the liquid, which may be either oil or water.

Activity Four: Write in the missing words.

The energy of sound also travels in waves. When you strike a bell, the _____ begins to vibrate. The _____ bell pushes the air near the bell makes air further out away from the bell vibrate, too. The _____ travel away from the _____ while each little vibrating pocket of air stays where it is. When you speak, the sounds you make are vibrations of the air that are started by vibrations of the _____chords in your _____. When you hear a sound, it means that vibrations that traveled through the _____ have reached your _____ and made your eardrums vibrate.

Light, too, travels in waves that are caused by vibrations that are passed along. But the _____in light are very different from the vibrations in sound waves or water waves. In sound waves and water waves, there are vibrating particles that pass their _____ from one to the other. In light waves there are no vibrating particles. In fact, light can _____ through empty space where there are no particles at all. The vibrations that _____ waves pass along through space are vibrations of electrical and magnetic forces. The _____that comes to use from the sun _____ 93 million miles through empty space before it reaches us.

ANSWERS:

Activity One

Windmill
Blowing
Rubber
Energy
Chemical
Chemical

Activity Two

Form
Energy
Chemical
Heat
Electrical Energy
Motion
Energy

Activity Three

Railroad
Cars
Mine
Oil
Gas
Powder
Pumped
Coal
Slurry

Activity Four

Bell	Larynx	Travel
Vibrating	Air	Light
Vibrations	Ears	Light
Bell	Vibrations	Travels
Vocal	Motion	

MORE WORD SEARCHES

Activity One: Read the paragraph and find the underlined words in the puzzle!

"There are may ways you can conserve energy in and around your home without sacrificing comfort or convenience. The most obvious direct benefit to you is the money saved on utility bills that can be used for other purposes. You will also be conserving energy resources which may be needed in the future."

--Governor Bob Graham

S	A	C	R	I	F	I	C	I	N	G
E	C	O	N	S	E	R	V	E	E	R
C	B	O	A	V	N	F	T	N	C	E
R	E	S	M	U	E	N	E	E	G	N
U	N	F	V	F	R	E	A	R	X	E
O	E	Y	E	N	O	M	V	G	M	E
S	F	U	T	I	B	R	A	Y	A	V
E	I	U	T	I	L	I	T	Y	B	N
R	T	I	V	R	E	S	N	O	C	O
E	C	N	E	I	N	E	V	N	O	C

Activity Two: Read the paragraph and find the underlined words in the puzzle!

What else can I do to make household hot water use more energy-efficient?

-- Lower the temperature setting on your heater to the lowest degree acceptable to your needs.
-- Never leave hot water running unnecessarily.
-- Fix leaky hot water faucets.
-- Limit dishwasher runs to full loads.
-- Consider installing a flow restrictor in the showerhead pipe to reduce water flow. Flow restrictors are available at most stores that handle plumbing supplies.

E	N	E	R	G	Y	R	S	F	A
P	L	U	M	B	I	N	G	E	H
I	D	E	G	R	E	E	T	D	E
P	Z	N	X	I	Q	B	Z	H	A
S	T	E	C	U	A	F	O	O	T
E	F	F	I	C	I	E	N	T	E
R	O	T	C	I	R	T	S	E	R
H	O	U	S	E	H	O	L	D	Z

Activity Three: Read the paragraph and find the underlined words in the puzzle!

Here's what proper insulation can do for you...

1. Could save you as much as 1/3 on your cooling and heating costs.
2. Could reduce the running time for your air conditioning and heating equipment, perhaps extending its life.
3. When building a new home or replacing your air conditioning equipment, lets you cool and heat your home with smaller, less expensive equipment.
4. Can make your home more comfortable.
5. Adds to the resale value of your home.

R-VALUE...What is it?

R-Value tells you how well a material resists heat flow. The higher the R-value, the greater the resistance. R-values vary with different types of materials. Therefore, how well insulation performs is more accurately measured by its R-value than by inches of thickness.

C	O	O	L	I	N	G	I
E	V	A	S	A	V	E	N
G	N	S	T	A	E	H	S
Z	R	V	A	L	U	E	U
R	U	A	L	U	L	M	L
F	L	H	O	W	A	O	A
R	S	U	Q	E	V	H	T

Activity Four: Read the paragraph and find the underlined words in the puzzle!

It's cheaper to save a barrel of oil than to produce an additional barrel. One projection indicates that turning all thermostats in the United States down two degrees in winter and raising them two degrees in summer could save more than half a million barrels of oil a day by 1980.

U	N	I	T	E	D	S	T	A	T	E	S	Q	Q
V	A	L	U	E	A	E	S	S	S	V	S	Q	Z
V	S	Q	D	D	Y	E	M	L	K	A	Z	K	H
V	S	U	M	M	E	R	N	O	P	S	J	I	Z
V	S	Z	D	D	D	G	H	H	H	H	H	H	Z
V	S	Z	D	D	R	E	T	N	I	W	Z	C	S
P	B	I	N	W	O	D	C	H	E	A	P	E	R
B	A	R	R	E	L	O	F	O	I	L	J	K	F
Q	P	R	S	L	A	N	O	I	T	I	D	D	A

THE PAL SYSTEM

Here's how it works!

1. Get a magazine from the table in the center of the room.
2. Look through the magazine for pictures or advertisements that show a concern about today's energy problems.

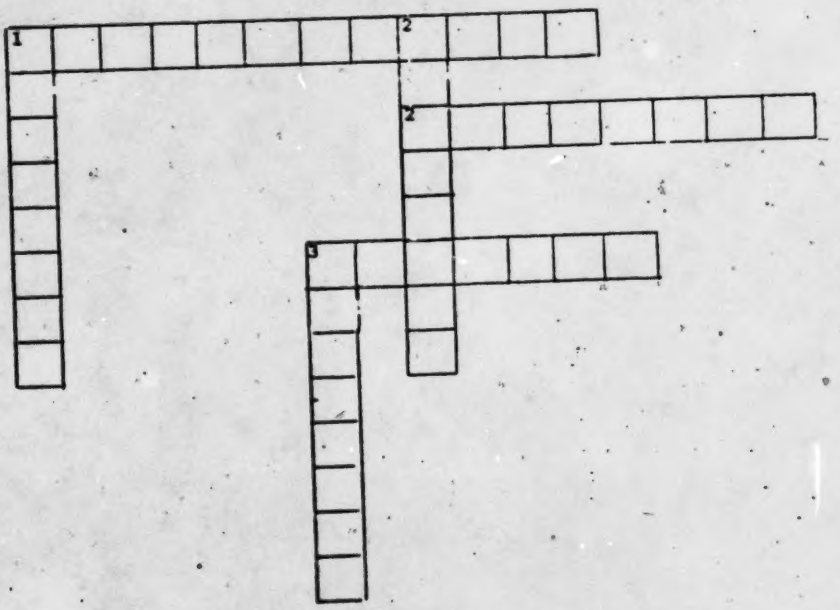
   -Cut them out and paste them on a piece of paper.
   -Then on a separate piece of paper answer the following questions:
   a. What does this picture "say" to me? Explain.
   b. How does it relate to the energy crisis? Explain.
   c. How will or does this effect my personal life? Explain.
3. Don't forget to put your name on your picture and question sheet.
4. Now trade your picture with a "pal" and again answer the questions.
5. When both of you are finished, choose a place to sit together in the classroom; then compare your answers.
6. When everyone has completed this activity, the teacher will randomly select students to:
   a. Show his/her picture;
   b. Tell how he/she answered the questions; and
   c. Tell how his/her pal answered the questions.

1. What does this picture "say" to me? Explain.
2. How does it relate to the energy crisis? Explain.
3. How will or does this effect my personal life? Explain.

VOCABULARY BUILDING Through Cross-Word Puzzles*

Activity One: Read the paragraph, then do the puzzle.

We can all change our living habits. Car owners have learned that big cars are wasteful. Small cars use less fuel. Those who need cars to get to work could join their neighbors in car pools. And, instead of hopping into the car all the time, we can learn to ride bicycles--or get used to walking.



ACROSS

1. We all can change our _____.
2. Those who need cars to get to work could join their neighbors in _____.
3. Instead of hopping into the car all the time, we can learn to ride bicycles or get use to _____.

DOWN

1. Small cars use _____.
2. Instead of hopping into the car all the time, we can learn to ride _____.
3. Car owners have learned that big cars are _____.

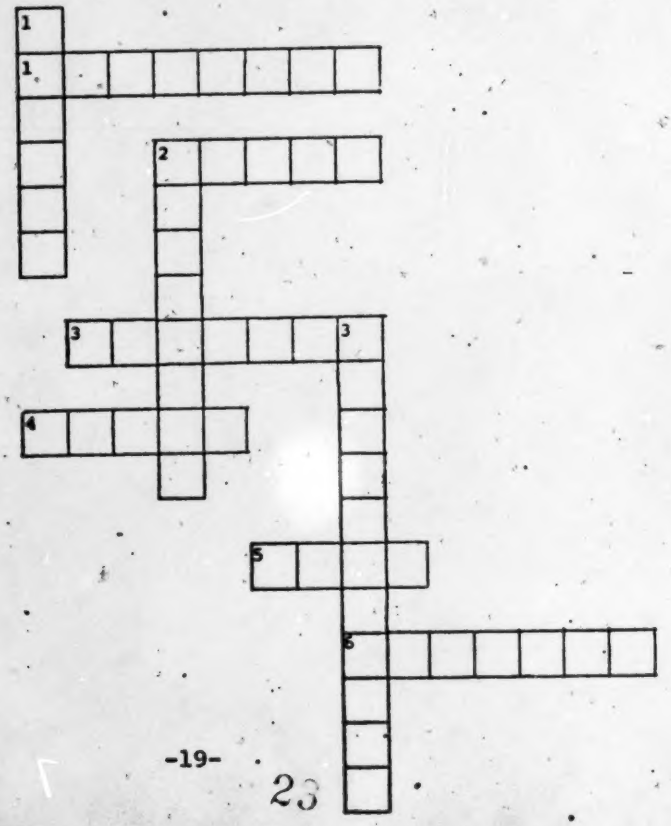
* All quotations are from Energy: What About the Future? Easy Energy Readers. Washington, D. C.: U. S. Department of Energy, 1980.

Activity Two: Read the paragraph and then do the puzzle!

In a floating power plant, warm water from one current would heat a liquid that vaporizes easily. The vapor would drive a turbine and generate electricity.

Cold water would be brought up from a deeper, lower ocean current. The water would cool the vapor after it had been through a turbine. The cooling would turn the vapor back into a liquid.

The process would continue over and over again. As long as ocean currents flowed warm and cool, electricity could be generated.



DOWN

1. Large bodies of water covering the surface of the earth.
2. What water does when enough heat is added to it.
3. A form of energy that supplies many of our homes.

ACROSS

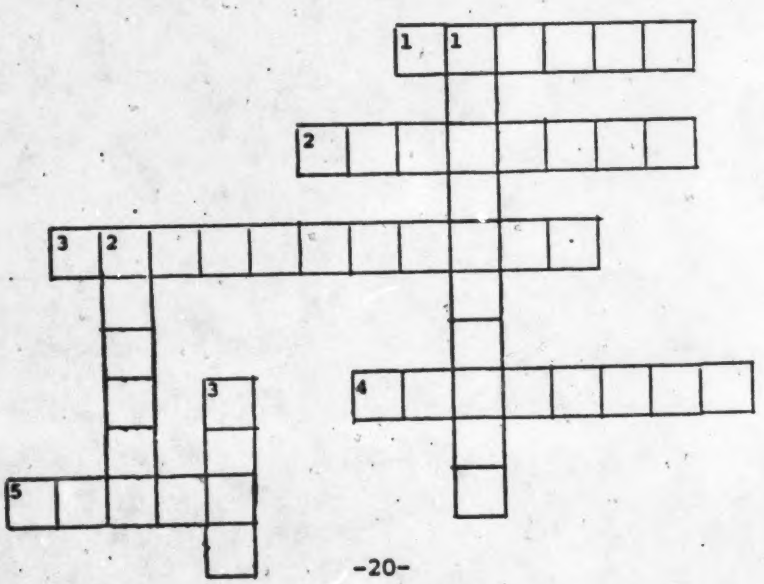
1. The flowing of water through a stream.
2. What water turns into when it reaches its boiling point.
3. A machine that is used to produce electricity.
4. Electricity is a source of _____ that can be used to do work.
5. Adding heat to an object will _____ its temperature.
6. Removing heat from an object will cause a _____ of its temperature.

Activity Three: Read the paragraph and complete the puzzle!

A Cleveland, Ohio, family carried out an experiment. They lived without any electricity for one day. Mr. and Mrs. James Marshall and their daughter, Nance, discovered how few appliances are really necessary. They didn't miss using their electric can opener or their electric coffee pot or even their electric tooth-brushes.

We can all change our living habits. Car owners have learned that big cars are wasteful. Small cars use less fuel. Those who need cars to get to work could join their neighbors in car pools. And, instead of hopping into the car all the time, we can learn to ride bicycles--or get used to walking.

Architects can design buildings that do not waste electricity. The glass skyscrapers now being build in cities from Los Angeles to New York must be heated or cooled constantly. And, in many of the buildings, lights must often be left on around the clock because they are part of the design.



DOWN

1. Items for convenience.
2. Visible energy.
3. Used to obtain energy.

ACROSS

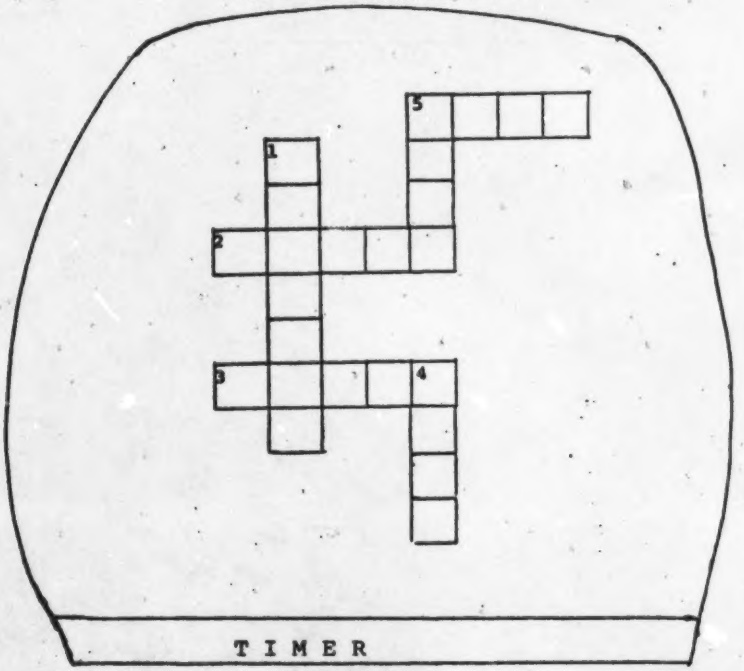
1. Learned behavior
2. A way to share and conserve energy.
3. Clean energy used in the home.
4. For exercise and conserving energy resources.
5. Inefficient or over use.

Activity Four: Read the paragraph and complete the puzzle!

So it's 1997, and it's raining, and you'll have to walk to work again. The subways are crowded, and any given train breaks down one morning out of five. The buses are gone, and on a day like today the bicycles slosh and slide. Besides, you have only a mile and a half to go, and you have boots, raincoat and rain hat. And it's not a very cold rain, so why not?

Lucky you have a job in demolition too. It's steady work. Slow and dirty, but steady. The fading structures of a decaying city are the great mineral mines and hardware shops of the nation. Break them down and re-use the parts. Coal is too difficult to dig up and transport to give us energy in the amounts we need, nuclear fission is judged to be too dangerous, the technical breakthrough toward nuclear fusion that we hoped for never took place, and solar batteries are too expensive.

TIME IS RUNNING OUT!



DOWN

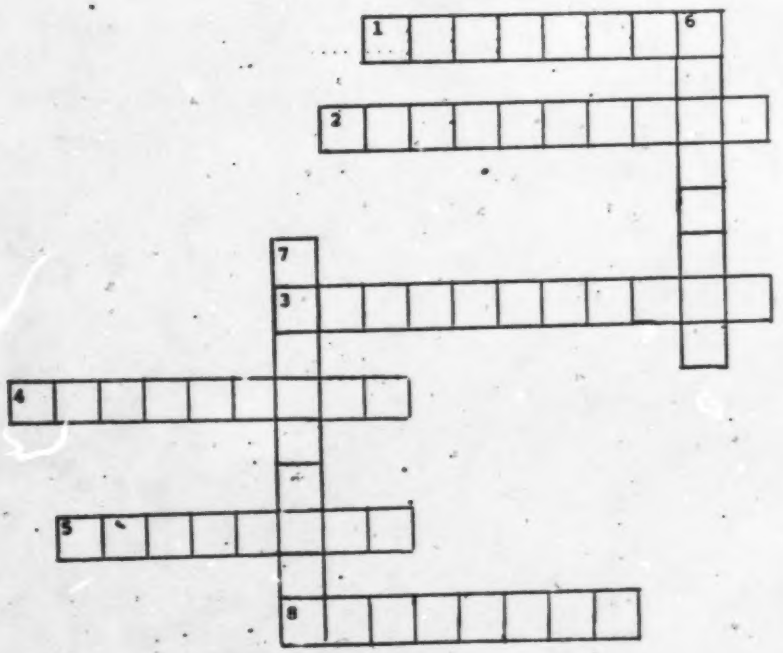
1. The splitting of atoms.
4. Water that falls from the sky.
5. A _____ is larger than a town.

ACROSS

2. Not clean.
3. Sun power.
5. Black mined mineral.

Activity Five: Read the paragraph and complete the puzzle!

Anyone older than 10 can remember automobiles. They dwindled. At first, the price of gasoline climbed--way up. Finally only the well-to-do drove, and that was too clear an indication that they were filthy rich, so any automobile that dared show itself on a city street was overturned and burned. Rationing was introduced to "equalize sacrifice", but every three months the ration was reduced. The cars just vanished and became part of the metal resource.



ACROSS

1. Disappeared.
2. The ice was an _____ that the temperature had dropped.
3. Cars.
4. To deny yourself of something.
5. To make the same on both sides.
8. A petroleum product, especially used in cars.

DOWN

6. The trees in the forest _____, or slowly disappeared, as they were cut down.
7. Limiting in order to conserve.

Activity Six: Read the paragraph and complete the puzzle.

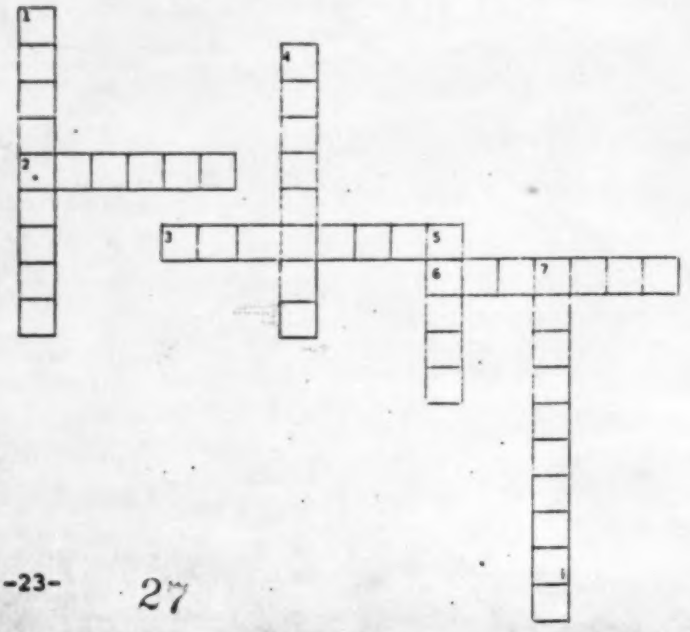
> Energy continues to decline, and machines must be replaced by human muscle and beasts of burden. People are working longer hours and there is less leisure; but then, with electric lighting restricted, television for only three hours a night, movies three evenings a week, new books few and printed in small editions, what is there to do with leisure? Work, sleep and eating are the great trinity of 1997, and only the first two are guaranteed.
>
> Where will it end? It must end in a return to the days before 1800, to the days before fossil fuels powered a vast machine industry and technology. It must end in subsistence farming and in a world population reduced by starvation, disease, and violence to less than a billion.
>
> And what can we do to prevent all this now? Now? Almost nothing.
>
> If we had started 20 years ago, that might have been another matter. If we had only started 50 years ago, it would have been easy.

DOWN

1. Fighting
4. Something that uses energy
5. What we do at night
7. When there is no food to eat

ACROSS

2. Ability to do work
3. Opposite of mornings
6. Relaxation

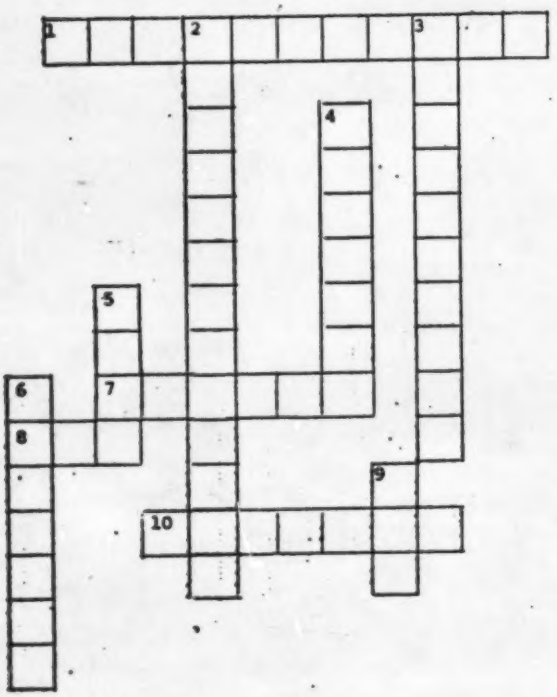


Activity Seven: Read the paragraph and complete the puzzle!

Oil and natural gas have been primary sources of fuel for modern industrial nations. These sources were convenient to use, versatile, and--until now--cheap.

But recently, industrial nations such as the United States have been turning their attention to alternative sources of energy. Oil and natural gas may soon present greater problems than they're worth. For one thing, no one can say how long the supply of these fuels will last. It's almost certain, however, that they eventually will run out.

Many people also are alarmed at the environmental damage oil and natural gas production can wreak. Oil that leaks from offshore drilling sites, or spills from damaged supertankers, can blacken and foul water and beaches, wiping out whole communities of animals and plants.



ACROSS

1. Something that can be used instead of something else.
7. The ability to do work.
8. Another word for petroleum (what J.R. drills for).
10. Not man-made.

DOWN

2. Having to do with where you live.
3. Nations that have factories.

4. Main.
5. Gas and other things that make things work.
6. Where things come from.
9. Shortened form for what is made by refining crude oil.

WRITING SENTENCES

Effective writing begins with a good knowledge of words and the ability to write effective sentences. Have students write a sentence for each of the following:

1.	Cars	Gasoline	Sunshine
2.	Nuclear	Safety	Electricity
3.	Water	Hydro-electric	Dam
4.	Trees	Wood	Chimney
5.	Passive	South	Solar
6.	B.T.U.	Summer	Florida
7.	Profit	Exploration	Off-shore
8.	Natural Gas	Mexico	Trade
9.	Gas Station	Gasoline	Gallon
10.	Big Car	Miles-per-gallon	Small Car

WRITING ENERGY HEADLINES

Students are assigned to bring into class articles from newspapers and magazines on energy themes and issues. The teacher cuts off the headlines on the articles and mounts each article on a piece of firm color paper.

Later, when the teacher has 50 or so articles collected and mounted, the assignment may begin.

Each student gets at least one article and is asked to write an attention-grabbing headline for each article. Then, the articles are exchanged and another student has to write a caption. Later, the students compare their headlines.

WRITING CAPTIONS FOR ENERGY PARAGRAPHS

Teachers and/or students should collect about 50 magazine and newspaper photographs on energy themes and issues. These should be mounted on firm color paper.

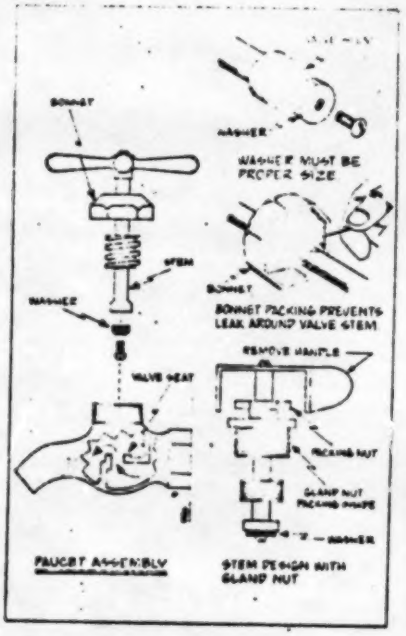
The photographs should be shuffled and distributed -- one to each student.

Each student should write a caption or cutline for one photograph. A caption is a descriptive, attention-getting line about a photograph. It does not have to be a complete sentence. A cutline is a block of descriptive writing under a photograph. While the cutline may include more than one line, it contains only complete sentences.

WRITING HOW TO DO ITS

Use the diagram at the right to write directions telling a friend how to replace a hot water facet washer--to stop dripping and energy waste.

Discuss with your parents how dripping facets waste energy.



Completing Unfinished Sentences About Energy

The teacher goes around the group calling on students to complete aloud the sentence with whatever comes to mind. Students may pass. A discussion will follow, with students elaborating on their answers.

Unfinished Sentence: If we run out of gasoline, then___ _____.

Discussion Questions:

1. What did you say would happen if we run out of gasoline?
2. You say that we wouldn't be able to drive our cars. What would happen then?
3. We would have to walk places (repeats what student has said). Do you think it would be a good idea to walk more places now, even though we still have gasoline for our cars?
4. What would happen if you asked your mom or dad to walk someplace with you instead of driving?

Additional Unfinished Sentences:

A. Home landscaping:
   1. Deciduous trees _____.
   2. Vines _____.
   3. Coniferous trees _____.
   4. On the southside _____.
   5. On the westside _____.

B. Home Energy Efficiency:
   1. Weather stripping _____.
   2. A thermostat _____.
   3. Attic heat in summer _____.
   4. Southfacing windows _____.
   5. Insulation _____.
   6. Your clothesline _____.

Understanding and Using Definitions of Fundamental Solar Energy Words:

1. Pre-writing Experience

Knowledge: David LaHart - Solar Energy slide show presentation.
Experience: "Hands-on" activities taken from "Solar Energy I & II packets" Science Activities in Energy - prepared by: American Museum of Science & Energy Oak Ridge Associated Universities AND SOLAR '80's - A TEACHER'S HANDBOOK FOR SOLAR ENERGY EDUCATION by David LaHart.

2. Writing Experience: Word Study

Write the various definitions of the following words. (Use 3-4 words per week that best apply to your discussion and presented material.) Pick out the definition that best applies to Solar Energy and use it in a sentence that would show a practical application in your home or community. Use an unabridged dictionary to define the words. The handouts will be helpful in writing the sentences.

1. Conserve
2. Energy
3. Food
4. Photovoltaic
5. Crisis
6. Water Wheel
7. Collector
8. Solar
9. Insulate
10. Power
11. Wind
12. Heater

3. Post-Writing Experience

Pay-Off: Grade with comments on the sentences.
Acknowledgement: Good sentences read out loud in class.
Feedback: Follow with discussion.
Post papers on "Solar decorated" Bulletin Board
Rewrite: After gaining better understanding of the words as they apply to Solar Energy have the students write new sentences using the same words. Change their application from the home and community to the school.

SENTENCE COMBINING FOR ENERGY PARAGRAPHS

To write, you have to first write good sentences! The following activities involve combining short, choppy sentences into more complex, powerful sentences. This will improve your skill in writing solid sentences.

Activity One:

1. Rivers have constant motion.
2. Rivers can lead to electric power generation.
3. Hydro-electric plants use rivers.

COMBINED SENTENCE! _____

_____.

Activity Two:

1. Wind is a natural source of energy.
2. Winds are not always present.
3. Windmills convert a natural energy source into a usable form.

COMBINED SENTENCE! _____

_____.

Activity Three:

1. The sun is a source of energy.
2. Florida has a lot of sunny days.
3. Hot water heaters use about 30% of our energy consumption.
4. Solar hot water heaters are reasonable and cost effective.

COMBINED SENTENCE! _____
_____.

Activity Four:

1. The sun is a source of energy.
2. The sun's energy is abundant.
3. The sun's energy will be used in the future.
4. The sun is valuable to our energy future.

COMBINED SENTENCE! _____
_____.

Activity Five:

1. Solar water heaters are efficient for homes.
2. Solar water heaters are economical.
3. Solar water heaters are going to be popular in Florida's future.

COMBINED SENTENCE! _____
_____.

Activity Six:

1. The sun produces radiant energy.
2. Radiant energy can be harnessed by solar cells.
3. Electricity can be produced from the sun.

COMBINED SENTENCE! _____
_____.

Activity Seven:

1. Deciduous trees drop their leaves in winter.
2. Deciduous trees do not have leaves in winter.
3. Homes need shade in summer.
4. Homes need sunshine in winter.

COMBINED SENTENCE! _____
_____.

Activity Eight:

1. Electricity is a very valuable resource.
2. Windmills can produce electricity.
3. Propellers are mounted on generators.
4. Propellers turn in the wind.

5. Turning propellers spin the generators.

COMBINED SENTENCE! _____
_____.

Activity Nine:

1. The sun is an energy source.
2. We can use the sun to heat our water.
3. We use hot water everyday.

COMBINED SENTENCE! _____
_____.

Activity Ten:

1. Solar energy is currently called an alternative source of energy.
2. Water can be heated by the sun.
3. The sun's light hitting the ground is free.

COMBINED SENTENCE! _____
_____.

Activity Eleven:

1. Solar energy is abundant.
2. The sun gives us solar energy.
3. Today people do not use enough solar energy.

COMBINED SENTENCE! _____
_____.

Activity Twelve:

1. Windmills were used in the 19th Century as a source of energy.
2. Windmills are a potential energy source for homes, farms, and factories today.
3. Many people have learned the importance of windmills.

COMBINED SENTENCE! _____
_____.

WRITING AN ENERGY CONSERVATION SURVEY

Assume that it is necessary to cut back on our use of energy. Note each of the following proposals as follows:

A. Strongly agree
B. Agree
C. Can't decide
D. Disagree
E. Strongly disagree

We should:

____ 1. Ban auto racing sports to save fuel.
____ 2. Put all schools and government offices on a four-day week, 10 hours per day.
____ 3. Prohibit use of private cars on Sundays.
____ 4. Raise the driving age to 20.
____ 5. Increase gasoline taxes 50¢ per gallon to cut down on gasoline use.
____ 6.
____ 7.
____ 8. (Students to add policy suggestions which they have, have
____ 9. heard at home, or have seen in the media,)
____ 10.

WRITE A PARAGRAPH

After our students have studied some energy theme or issue and have some knowledge base, they might be asked to write a paragraph. The process for refining their skill is as follows:

a. Topic sentence (the teacher might supply this, see below);
b. Jot down ideas to go with the theme of the topic sentence;
c. Cull through the ideas listed which will go best with what one wants to say to develop the topic sentence;
d. Arrange the ideas into a paragraph form following the topic sentence;
e. Write the paragraph in a rough draft; and
f. Read and rewrite! Rewriting is the key to fine writing. Get your friends and neighbors to read your paragraph, and then rewrite the paragraph. Always ask yourself "What does this mean?" and "How does this sound?"

Sample Topic Sentences on Energy:

1. Nuclear energy is the hope for our energy future in the United States.
2. There is a great deal that the average citizen can do to conserve energy.
3. Solar energy can help us save fossil fuels today.
4. The higher the cost, the lower the use of gasoline.

WRITING A PARAGRAPH

Write a paragraph on solar energy using the ideas in the seven sentences below. Begin with a topic sentence for your paragraph.

a. Solar is a renewable, clean source of energy that is in abundant supply.
b. Unlike petroleum, the price and availability of solar energy are not subject to unpredicable or unwarranted manipulations by other nations.
c. A healthy solar industry will aid in Florida's industrial development.
d. Solar applications will create jobs.

e. Unlike nuclear, solar energy has almost universal public appeal.
f. Sunshine is the most important reason for Florida's healthy tourist industry.
g. The sun is the source of all life on earth.

TOPIC SENTENCE: _____
_____.

Activity Two: Develop a topic sentence and use the following sentence in a paragraph:

1. The Wauchula Power Plant has been operating since 1937.
2. It runs on diesel fuel.
3. It is only a peak load station, operating in the mornings and evenings.
4. Diesel fuel costs over a dollar a gallon, and the cost is going up each month.

TOPIC SENTENCE: _____
_____.

Activity Three: Develop a topic sentence and use the following sentence in a paragraph:

1. George Washington Carver believed that all substances had a use.
2. Kaplan Industries in Bartow, Florida, is making use of every part of the cow.
3. Cows' manure is used to produce methane gas.
4. Methane gas is used to make electricity and steam to run the Kaplan plant.

TOPIC SENTENCE: _____
_____.

Activity Four: Develop a topic sentence and use the following sentence in a paragraph.

1. As the population of Wauchula grows, the demand for electricity will increase.
2. The cost of diesel fuel is high and getting higher.
3. In Wauchula, diesel engines are used to produce electricity.
4. Parts for Wauchula's diesel engines are very expensive and are difficult to obtain.
5. Diesel engines are very costly means to make electricity.

TOPIC SENTENCE: _____
_____.

A NOTE ON WRITING

Writing in content areas of the school curriculum should be focused upon the following goals, presented here in order of their importance:

1. Helping students to process ideas into words, sentences, paragraphs, and longer sequences of the appropriate gender and clarity;
2. Helping students to think clearly and to communicate powerfully and effectively as the means to share ideas, influence others, and live a full, effective life as an educated person;
3. Helping students to master skills appropriate to various kinds of thinking and writing;
4. Helping students to develop precise, functional vocabularies; and
5. Helping students to master conventions such as grammar, spelling, punctuation, and capitalization.

Writing is communication, sending a message with a purpose. A person cannot write clearly, unless he can think clearly. A person cannot write effectively if he/she does not know anything or have anything to say. What students write reflects what they know and how they think as well as revealing their competencies in the mechanics of writing (e.g., spelling, grammar, and punctuation).

Traditional English teachers have concentrated on the mechanics of writing. Their courses offer lessons in spelling, diagramming sentences, recalling the parts of speech, and so forth.

Social studies teachers have assigned some priceless themes for papers. "Write a report on France" is one familiar topic. Others take the following form: "Students will write a paper, agreeing or disagreeing with the following statement, supporting what they say with an argument: The United States is a democracy and environmental controls on business and individuals are contrary to the principles of democracy and free enterprise and should not be employed in the Untied States."

There is not much structure to these writing assignments. Students too often do not have the background to write well and are forced into modifying encyclopedia entries! There is some question about whether they are worth writing--at least from the students' perspectives. And we might ask what the pay off is for having written such assignments; that is, who cares?

Writing assignments in the content areas of the school curriculum ought, at least, to meet the following:

1. Writing a message which is worth sending;
2. Writing a message on real world issues which real people outside the classroom care about and argue about;
3. Writing a message to persons interested in receiving a message, and who are open to being influenced by the message sent to them (e.g., teacher, mayor, utility official, parents, etc.); and
4. Writing a message to get real feedback, so that students learn that good writing is worth the arduous effort that it requires!

These can be summarized as: REAL MESSAGE (something worth saying)
REAL ISSUE (something cared about)
REAL AUDIENCE (valued audience to influence)
REAL PAYOFF (valued response from significant others--not just a grade)

The "report on France" and the "principles of democracy" assignments violate these principles, and thus, teachers rarely elicit powerful and effective student writing with such assignments. To add insult to injury, the students tend to learn very little by doing such assignments.

To make better assignments, teachers have to build in the four ingredients: REAL ISSUE, REAL AUDIENCE, REAL MESSAGE, and REAL PAYOFF. Then, in working students through the assignment, there are three phases: PRE-WRITING PHASE, WRITING PHASE, and POST-WRITING PHASE, including rewriting.

I.	Pre-writing Activities	Personal experience Knowledge Values and feelings
II.	Writing Activity	Content (energy) Writing skill stressed Writing Mechanics
III.	Post-writing Activities (and rewriting)	Payoff for writers Feedback Rewriting

PRE-WRITING: Students need to learn about, experience, and reflect upon what they are going to write about. It is here that they develop something to say! Obviously, the pre-writing activity should be engaging and stimulating.

WRITING: Students write; attending to content, organization, and the mechanics of writing.

POST-WRITING: Students get their "payoff" and feedback here. Teachers might use peer review sessions, discussing the content and organization of papers and assisting in solving the problems students have identified in their writing.

Dealing with mechanics, teachers might focus only upon one or two problems at a time, (e.g., capitalization and spelling, then, several months later, commas and periods, and several months later, paragraph structure).

At some point, each student should rewrite his/her paper, and then use paper with the intended audience.

Several examples of this writing process appear on the next several pages. All of the assignments in this booklet are open to use in the PRE-WRITING, WRITING and POST-WRITING process which we are recommending.

WRITING WITH A PURPOSE

GOAL: The students will learn and describe the sources of energy and their uses.

CONCEPT: The energy we use is obtained from several sources.

PRE-WRITING Activities:

1. The teacher will show a film about energy and where it comes from. Energy to Burn, 16 mm, sound, color, 15 minutes, available on free loan from C. Richard Tillis, Office of Environmental Education, Knott Building, Tallahassee, FL 32301.
2. The teacher will take the students to the Wauchula Power Plant and observe the production of electricity from a fuel source, diesel.
3. The teacher will read an article on a source of energy as an example. Groups will be formed and assigned to find current articles on energy sources. (Popular Science, National Geographic, Mother Earth News, newspapers, etc.)
4. The teacher will conduct experiments on energy sources. (Solar - Music box, fan, truck, clothesdryer, etc. Petroleum - model cars, planes, generator. Electric - fan, lights, TV, A/C, films, etc.

WRITING Activities:

1. Students will complete sentence fragments.
   a. The sun is.....
   b. Gasoline can be.....
   c. We use steam.....
   d. The power plant.....
   e. Natural gas.....
2. The teacher will present four sentences which will be formulated into a paragraph. The student will supply the topic sentence.

   a. Gasoline is becoming very difficult to obtain.
   b. The price of gas is constantly increasing.
   c. Oil is a non-renewable source of energy.
   d. People need to conserve gasoline.
3. Students write letters to the following places for information on current developments of new energy sources (See list at the end of this booklet).
4. The student will combine sentences to form one complete sentence.
   a. Oil is a non-renewal source of energy.
   b. Oil use is constantly increasing and is very expensive.
5. The student will write one page on energy sources. Their reference materials will be their knowledge gained from the unit.

POST-WRITING Activities:

1. Students will read papers to class and teacher will comment on content.
2. Papers will be rewritten based on oral and written comments about them.
3. Information gained from letters will be shared.
4. Write a paper and describe what you liked or disliked about this unit.
5. Each group will select one paper to be posted and judged for an Energy Source-Use Contest. The best solar papers should be mailed to Dr. David LaHart, Florida Solar Energy Center, 300 State Road 401, Cape Canaveral, FL 32920, for his comments. The best papers on nuclear or fossil energy should be mailed to Dr. A. Henry J. Hagedoorn, Mechanical Engineering Department, University of Central Florida, PO Box 25000, Orlando, FL 32816.
6. Several papers will be posted on the bulletin boards for observation.

Descriptive Writing for "Energy Experiences"

Possible sources of "hands-on" observations:

1. Wauchula Power - possibly Crystal River
2. Kaplan Industries
3. American Orange
4. Sewage Treatment - as a backup to Kaplan Industries
5. Possibly - Sebring Utilities Commission or Florida Power Corporation, Avon Park Plant

FORMAT for 1. Pre-Writing as examplified below
2. Writing by using Kaplan
3. Post-Writing Industries

I. PRE-WRITING - Start Unit on Energy

1. Sources - a. Classroom textbooks
b. Materials from Energy Workshop
c. Materials from Department of Energy
d. Bring speakers from the Energy Community in to develop different aspects of study when available

Dealing with Kaplan Industries - first develop through class discussion the fact of limited resources and the need for alternative energy sources. Discuss the possible energy sources available to us and give information to verify that these resources are running out. Reinforce this concept using the Energy-Environmental Simulator (available on loan from Dr. A. J. Henry Hagedoorn, University of Central Florida). After the use of the Simulator, discuss what alternate sources are available as energy supplies that would be different than the ones used on the simulator.

If anaerobic fermentation is not brought up, make sure it is introduced! via a) experiments, b) presentations, c) diagrams, and d) films.

Example: Have a "pile" of the end product of the anaerobic fermentation (manure) and show how beneath there is a present of heat and different gases (fertilizer).

Bring in methane gas and discuss its uses and sources (as end products).

Bring in CO_2 and discuss its uses and sources (as end products).

Develop evidence that "manure" does contain gases that are usable as an energy source alternative.

How - Experiment - On a small scale

Heat a supply of cow manure to collect methane gas. Demonstrate the presence of the gas by doing a "can pop" presentation. Fill a can with a loosely covered top with the collected gas and show the top shooting OFF when gas is lit. Also, as development - as to what this fermentation process is, show a film on it.

Development of the Anaerobic Fermentation

1. Show slides of Kaplan Industries and what the process entails.
2. Ask students if their parents are employed there and if they can possibly come in to discuss the process.

Finally, as the last stage of Pre-Writing, have a field trip to Kaplan, if possible, to reinforce all concepts introduced.

II. WRITING - Possible exercises to go along with Pre-Writing experience.

1. List all possible energy sources on board.
2. List reasons for alternative sources.
3. Write what they think our energy sources will be in the future (30 years) after using the Simulator.
4. Dictionary exercise on Anaerobic Fermentation.
5. Sentence fragment exercise - a) when energy runs out
   b) manure can
   c) garbage
6. Paragraph completion on energy sources or alternative sources.

What students would be expected to write about after going to Kaplans:

1. Write a letter of "thanks" as a group to Kaplan Industries, Bartow, FL.
2. Supply students with an outline of what occurs during the fermentation at Kaplans. They will be expected to write complete sentences describing each part of the process.

OUTLINE

1. Cattle in pens
2. Slits in pen floor
3. The force of gravity
4. Scrapers
5. Recipe for feed
6. Holding tank
7. Boiler
8. Methane
9. Solid end product compressor liquid
10. Power plant

III. POST-WRITING

1. Students will read aloud their responses to certain parts of the outline.
2. Classmates and teacher will provide feedback on what the student reads from his paper.
3. Papers are graded by teacher giving written comments on the grammar of the sentences.
4. Comments will also be on the correctness of what was said in the sentences.
5. The letter will be mailed to Kaplan Industries.

IV. REWRITING - Have students supply a complete essay on the workings of Anoerobic Fermentation using their sentence (corrected) outlines.

Complimentary Writing Activity:

After the Kaplan Industries trip and writing, have students visit the Wauchula Sewer Treatment Plant. Their main question is: "What, if any, Kaplan technology could be used at the sewer treatment plant to produce energy sources?

Students would write a report for the Wauchula Utilities manager or the city commissioners. They would be invited to visit the class and discuss the report and recommendations with the students.

Window Treatment to Save Energy

I. Pre-Writing Activity:

Students will read portions of the publication "Saving Energy in the Older Home" (G. 2911, available from your Home Economics Center Extension Agent), pp. 4-5, on window placement and the effect of windows on home heating and cooling costs. Students will also use the Florida Solar Energy Center's Energy Note entitled, "Window Treatment for Energy Conservation." Students will do experiment #7 in Science Activities in Energy" Solar Energy on "How Much Hotter a House Gets When the Windows Face South Instead of North."

II. Writing Activity: Complete the sentences.

1. Houses should be oriented toward the North or South with ample shade for summer.

   My house is oriented _____.

   My family might _____.

2. Roof overhangs and covered porches are designed to exclude the high summer sun by shading south facing windows and doors.

   The south side of my house _____.

   My family should _____.

3. Most effective for east and west facing windows is a combination of tall trees (deciduous trees) and lower protective shrubbery.

   The east and west sides of my house _____.

   My family might _____.

4. A house with northern exposure may have large windows and little shade in Florida.

   The northern side of my house _____.

   My family might _____.

III. Post-Writing Activities:

After peer and teacher review, and after rewriting, students should share their sentences with their parents and even neighbors. Some students may want to design a model house for energy efficient living in Hardee County, Florida.

WRITING ENERGY EXPLANATIONS

I. PRE-WRITING: Do some of the activities in Science Activities in Energy: Electrical Energy. Explain basic electrical terms: flow of electrons, volt, amp, watt, kwhr. Demonstrate how an electric meter works. Use "Reading Electric Meters" Agricultural Engineering Fact Sheet, Florida Cooperative Extension Service # AE-23, 1980.

II. WRITING:

Activity One: Partial sentences

1. A volt is similar to the water pressure in a hose.
2. A amp is similar to the _____.
3. A watt is _____.
4. A meter _____.

Activity Two: Write a paragraph on "How energy can be conserved in your home."

Activity Three: Write a paragraph on "How an electric meter works." Then compute the energy used in your own home in a week by reading the meter each day for a week, and keeping a record.

III. POST-WRITING:

Write a paragraph comparing and computing the energy used in your home before and after conservation methods have been used. Send this paragraph to your parents, after a peer and teacher review--after you have rewritten the paragraph.

WRITING PARAGRAPHS EXPRESSING ENERGY OPINIONS

Activity One:

The electric company has recently had to raise its rates due to fuel adjustments, making it increasingly harder for poor people to pay their bills. It has been found that the poor use less electricity because they have fewer appliances. The company is considering the inverted block rate, in which the first 500 kilowatt hours would have a certain rate, thereafter each 500 kilowatt hours would have a higher rate.

Discussion Questions:

1. Will this plan allow the company to continue to operate at a profit?
2. Should people who have all-electric homes be penalized for using more electricity rather than some other fuel?
3. Should people who can afford many electrical appliances be penalized? Is it not true that they are helping people who work in factories making the appliances keep their jobs?

Writing Assignment: Respond to Question #4 as follows:

4. "Is this a fair way of billing? Should the same rate be charged for all?"

Your Position _____
Topic Sentence _____
_____

Your Reasons 1. _____
_____
2. _____
_____
3. _____
_____

Activity Two:

1. The teacher will read the following out loud to students.

   You live in a small town where the cost of living is reasonable. In recent years the Utility Company has increased their rate considerably. You and your neighbor have gotten together and discussed this matter. It seems that the more electricity you use the cheaper the cost. For example, you live in a medium size house and use the average amount of power and pay a high rate per unit for power. The Gennaro's who live across the street, have a large house with air conditioning, use many electrical appliances and actually pay less per power unit. This does not seem fair!

   Recently, you have found out that local businesses get the lowest power rate because they use the largest amount of power.

   Many people in the community are becoming aware of this issue. They are starting to complain and want something done. They feel if you use more electricity you should have to pay more! The town officials think differently. They want to attract new business to move into the area and the Utility Company claims it's less expensive to serve larger customers, so they feel the rates are fair.

   You and a small group have contact the Commissioner's office and he will be meeting with you to discuss this matter.

2. Next students will silently read this handout:

   Ronald is a local business man in the community. He has always been thought of as a fair and honest citizen. Most people that come into his store, he has known for years.

   Ronald has been asked to be on the committee that will meet with the Commissioner. Recently, he has been getting pressure from the town's people and the business people on which way to vote. Ronald wants to vote for the town's people, but he knows if he does, this will put him in a disadvantage with his business friends.

There are seven people on the committee. It has become quite obvious to everyone that 3 people will be voting for lower cost with lower electricity usage and 3 people will be voting against lower cost with lower electricity usage. Everyone is anxious to see which way Ronald will vote.

As Ronald leaves his house this morning to meet with the committee and Commissioner, he thinks--How should I vote?

3. The teacher will ask students the following questions and, after the correct response, the teacher will write it on the overhead projector.

   a. Are there any terms or phrases you do not understand? How about...?
   b. What are some of the characteristics you need to keep in mind about the central figure?
   c. State the facts of the situation.
   d. What choices do you have?

4. The class will form one large circle. The students will think of all possible action Ronald could have taken. The teacher will list these on the overhead projector.

5. The teacher will ask students to identify the possible consequences for each course of action.

6. After examining the consequences, students will:

   a. Choose a course of action they think should be taken.
   b. State their reasons for that choice.

7. The students will be presented with the following article:

Keep government out of energy

Editor:

Your editorial of 2/16/77 which espouses the cause of nationalization of the energy industry, appalls me because you are ignoring a fact of elected government, which is no less than the very profit motive you seek to replace: people in government like to be re-elected.

Admittedly, energy companies wield perhaps too much power, but at least they are decentralized and compete with each other. Not so our government.

The simple fact is that energy costs are responding to a classic economic situation — scarcity coupled with high demand. High energy prices are our best insurance; they will make possible the development of alternative (although more capital-intensive) energy sources. Capital is always attracted to profit. Proposed solar energy capital equipment may cost a whole order of magnitude more money per kilowatt than present-day sources (fossil fuels) do for their equipment.

You may say, "Let the government capitalize this new equipment." And this may in fact happen, because our present policies which control energy prices are pushing us to the brink of disaster, at which point our crisis-oriented society will cry out for something to be done, and hang the expense.

But wouldn't it be better for people who are risking their own capital (and who will therefore be more careful with it than a group of squabbling elected officials) to develop alternative energy sources in an orderly and cautious manner?

Look with horror at the United Kingdom's examples of industrial nationalization, and let the market system do its job. Let the government stay out of energy.

Steven R. Newcomb

8. The teacher will read the article out loud and then ask:

   a. What is Steven's position in this article?

9. When a student gives her the correct answer she will write it on the overhead projector (or blackboard).

10. What reasons does Steven give to support his position?

    a. _____.
    b. _____.
    c. _____.

11. The students will be asked to answer the following questions.

    a. What position do you take?

    b. What are your 3 best supporting reasons?

       1. _____.
       2. _____.
       3. _____.

12. Homework:

    Please bring to class an article expressing an opinion on any of the following:

    Energy consumption
    Price of electricity
    Government regulation on energy

    Use the same format and procedure we used in class today. Be prepared for a class discussion on your energy related articles.

Super Bowl XV

Battle of the basics

Super Bowl XV was played Sunday, January 25, 1981, in the SUPERDOME, New Orleans, LA. You lived in Philadelphia and had a chance to go to the game. The distance from Philadelphia to New Orleans is 957 miles. Your car gets 20 miles per gallon driving at 55 mph; 18 mpg @ 65 mph and 15.5 mpg @ 70 mph.

a. Figure how many gallons of gasoline you would use for a round-trip at each speed.
b. Average the amount of fuel for the three speeds.
c. Multiply the average by 1000 other cars going to New Orleans from Philadelphia.

Questions for Discussion:

1. The Super Bowl is probably the biggest sporting event in the United States and many people from many cities attended. How much fuel do you estimate could be saved if everyone attending the game drove 55 mph instead of 65 mph?

2. Do you think driving 55 mph to the Super Bowl and the resultant fuel savings should be widely advertised?

Writing Assignment:

3. How do you feel about big sporting events that cause many people to drive many miles? Write a paragraph giving your opinion on some supporting reasons.

Anne McCullen

Activity Four:

You have just been chosen to represent your school at the regional mathematics competition held in a town that is 125 miles away. You could borrow your mother's cars, a 1978 Lincoln, and drive for approximately $40. A round trip bus ticket costs $41.75. You really would rather drive the car because you will have to walk two blocks from the bus stop to get to where you need to be for the competition.

Discussion Questions:

1. How would you contribute to saving energy by taking the bus?
2. Considering the overall expenses involved in operating a car, how do the costs compare?
3. Would you be more inclined to take the bus if the ticket were $35?
4. Do you think people should take public transportation instead of private cars when the price is about the same?
5. Does saving energy mean enough to you that you will take the bus and give up the convenience of driving the car?

Writing Assignment: Write a paragraph which answers Question #5 above.

Sandra L. Rice

Activity Five:

A small college was concerned about using energy. A sign placed on the one elevator in the science building read, "for the handicapped only." The building has four stairways leading to the second and third floors.

Discussion Questions:

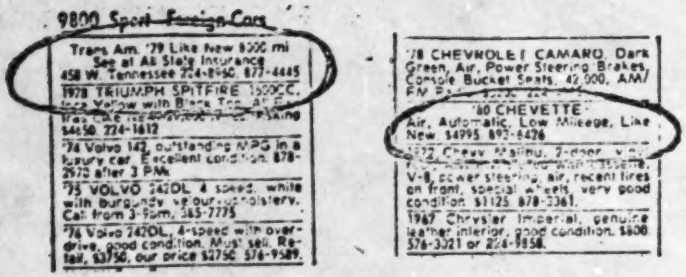
1. Is this a good example of conserving energy?
2. Could this help people think more about conserving energy?
3. Should more public buildings do this?

Writing Assignment: Write a paragraph which answers:

4. "Was this a fair thing to do? Why or why not?"

Sandra L. Rice

Activity Six:



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576-3221 or 224-9858.

Tallahassee Democrat

8E—Sunday, January 18, 1981

John has saved his earnings from summer jobs over the past several years, and, as a high school graduation present, his father has offered to match his savings so that John can buy a car. John can buy any car that he chooses within his budget, and has narrowed his selection down to two choices--a '79 Trans Am and an '80 Chevette. Both cars have low mileage, and are like-new. The Trans Am is fully-loaded and gets 12 to 15 miles per gallon, while the Chevette is claimed to average 20 to 25 miles per gallon. John has always chided his parents for driving a Cadillac, calling it a "gas-wasting bomb." On the other hand, though, he's worried about what his gang at school will think of a Chevrolet Chevette.

Discussion Questions:

1. What are the factors influencing John's decision about a car?
2. Are there reasons that gas mileage should be a consideration?
3. In what ways can you identify with John?
4. How important do you think it is to consider your friends' opinions?

Writing Assignment: Write a paragraph telling which car you would purchase, and giving your reasons.

Chris Burton

Activity Seven:

There was a gas shortage in the United States. People had to wait for hours and hours in very long lines to get gasoline for their cars. In some states they even alternated the days you could and could not buy gas. People began to get very mad about the situation. Some even had shouting-matches and fist-fights while they waited. Many felt there was no real shortage, believing the gas companies just made it up so people would not mind if they raised prices. Others saw it as a warning of things to come if we did not start conserving our fuel. It was a difficult time for our country.

Discussion Questions:

1. Do you remember hearing about the gas crisis?
2. Did you ever have to wait in line with someone for gas?
3. Why do you think people got angry and upset?

Writing Assignment: Write a paragraph which responds to Questions #4.

4. "Would you be angry if you could not go somewhere because there was not enough gas for the car?

M. S. Torres

Activity Eight:

Martha and James Jones worked for many years in a struggling business, living in a small house, and raising a family. Now their children are grown, business has boomed, and they want to build the kind of house they have always dreamed of: a large two-story with all the appliances, as they want their retirement to be leisurely. The new house will cost much more to run but they can afford it. Besides, they want to have enough room for all the children and their families to visit at the same time.

Discussion Questions:

1. Would the Jones be adding significantly to the energy problem?
2. Should Martha and James Jones use more energy than they really need?
3. Should they give up their dream house and build something smaller that would take less energy to run?

Writing Assignment: Write a paragraph in response to Question #4.

4. "As taxpayers and contributing citizens for many years, have the Jones earned the right to spend their money as they please?"

Sandra L. Rice

WRITING: SHARING YOUR VIEWS

Students might write down their "answers" to one of the five questions about schools and energy.

1. Do the schools of the Southeast U.S. face a serious energy problem? What are the:
   a. long-term problems?
   b. short-term problems?

2. Can instruction play a significant role in dealing with our energy problem:
   A) at the school?
   B) in the community?
   C) in the nation?
3. Can effective energy education be conducted in a school which is energy inefficient and wasteful?
4. Is a school or school district's efforts toward energy efficiency an essential component for any energy education curriculum efforts?
5. Should local school districts implement an energy conservation education program now? If so, list ten things which your school district can do right now to save energy.

WRITING LETTERS ON ENERGY MATTERS

1. Write to Governor D. Robert Graham, The Capitol, Tallahassee, FL 32301, about your reaction to his TV "Save It, Florida" advertisements (express an opinion).

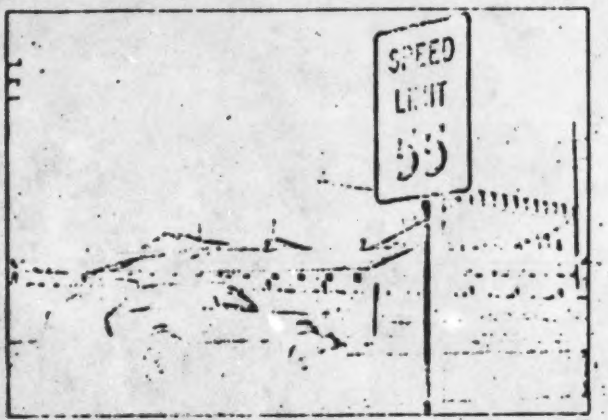
2. Write to your State Representative or Senator about an energy issue (e.g., 55 mile per hour speed limit, increased taxes on gasoline, electricity costs) (express an opinion).

3. Write a letter to the editor of your local newspaper on a local energy (make an appeal to others).

4. Write a letter to a State Agency to get information on an energy topic (e.g., solar energy). See the list of agencies at the end of this booklet (make a request for action).

5. Write a letter of appreciation to officials or to agencies for their actions on energy issues or conservation (state praise or thanks).

6. Write for information on new energy careers: Technical Information Center, U.S. Department of Energy, PO Box 62, Oak Ridge, TN 37830 (make a request).



A drive for speed

The 55-mph speed limit is "about as popular as having the mumps," says Wyoming's Sen. Cal Taggart, who has proposed legislation to raise the limit to 65 mph. Taggart hopes to make Wyoming the first state to repeal the 55-mph limit. The Senate's first vote on the measure is expected this week.

From:
The Tallahassee Democrat
January 20, 1981

Certain members of the legislature, convinced by testimony of long-distance truckers that a 55 mph speed limit is not necessarily fuel-efficient, are considering a bill that would repeal the 55 mph limit. They say that the reduced speed limit isn't being enforced anyway. Other members of the legislature are opposed to increasing the speed limit. They contend that extra money spent on enough highway patrolmen to rigidly enforce the 55 mph limit would be more than made up for by the savings in gasoline and human lives that would result.

Discussion Questions:

1. Why do the legislators have such differing opinions about the same issue?
2. Do you think speed limit is an important issue? Why or why not?
3. Do you do anything to let your feelings be known by the people who make our laws?

Writing Assignment: Write a letter to Governor D. Robert Graham expressing your views on the 55 mph law.

Chris Burton

Tammy's family got the December electric bill, which was $35 over what the family had budgeted for that expense. Her mother and father decided that the thermostat must be kept at 68 degrees at all times to conserve energy, thus reduce the electric bill. Tammy is at home alone from 3:20 until her parents get there at 5:40. She is on her honor to keep the thermostat at 68 degrees, but her friend, Jill, comes by every Wednesday after school and Tammy is afraid that Jill will make fun of her family for having a cold house.

Discussion Questions:

1. How will keeping the thermostat set at 68 degrees help save energy, thus making the family's bill less?
2. What other ways to save energy could the family use instead of lowering the thermostat?
3. Tammy is tempted to raise the thermostat just when Jill comes so that Jill will not make fun of her for having a cold house, should she do this? Why or why not?
4. Should Tammy explain the reason for her family doing this and tell Jill the importance of saving energy?

Writing Assignment: Write a letter to Tammy giving her some advise on a solution to her problem.

Sandra L. Rice

Write a letter....Express an opinion

Tell President Reagan what you think should be done about America's energy problems. Speak out and send your message to the top!

The President
The White House
Washington, D.C. 20500

Dear Mr. President:

Respectfully,

_____

TAKING A STAND...AND WRITING IT DOWN

Since we need to reduce our dependence on foreign petroleum, I would favor:

A) Rationing or censoring all fuel oil;
B) Government price controls;
C) Letting prices rise as supplies go down;
D) Tax big users of petroleum;
E) Government grants for oil exploration;
F) Rush into full-scale use of coal and nuclear power.

Write a position statement...giving your position and the supporting reasons.

Paragraphs for Persuasion:

Read the following quotation on coal. Underline the emotional words--words which are used to persuade us, to get us to accept the author's message and opinions.

> "The largest coal mine in the U.S. today is a strip mine in New Mexico, which feeds the mammoth coal-fired Four Corners power plant. When the Four Corners plant was conceived more than a decade ago (to feed the electric power appetite of Los Angeles and the populous parts of the Southwest), planners thought its location ideal. It was out in the desert wilderness, where no one but a few Navajo and Hopi Indians live. There were thick virgin seams of coal nearby. And water, though scarce, was just sufficient for the plant's operation.
>
> "Today Four Corners is full of environmental troubles. For years it poured out hundreds of tons of soot and ash every day, obscuring the clear New Mexico sky. Newly-installed filters have cut back ash and soot polution by 90 percent. But sulphur, nitrogen oxides, and sub-micron particles still escape in vast quantities, making smog, and threatening health. Doctors in nearby Durango, Colorado, report a more than 100 percent increase in respiratory illness among children since Four Corners fired up.
>
> "The plant uses precious water from the Colorado River System, degrading the water supply that reaches irrigated farms downstream. It burns coal from a huge strip mine in arid country, where reclamation may prove terribly difficult. The Navajo and Hopi of the region are torn between the economic benefits of the plant and its mines, and what they see happening to their land and water.
>
> "Four Corners is not an accident. It is just the first of a half dozen enormous plants which will export plentiful power to California while importing Los Angeles smog."*

Now write your own persuasive paragraph, using emotional words, on an energy issue.

Writing About the Efficient Use of Oranges:

PRE-WRITING Activities:

The children write a letter to American Orange Company, Wauchula, FL 33873, asking someone to come to the school to explain the process of the plant before it is visited. Through this speaker, the children will also learn the value of the oranges and the value of orange plant workers and pickers.

A field trip is planned and the children are on their way. At the plant they see the total process from the truck being unloaded to the canned product. Here they learn about the energy it takes to run the plant to process the oranges. Also energy losses can be seen. For example, the left over pulp could be processed into alcohol and then to cattle feed (high protein). This

*Quoted from Katherine Gillman, "U.S. Energy Use in Historical Perspective, 1900-1970," Ford Foundation, Unpublished Paper, 1973.

process can be aided by the steam, which is now wasted. They also could learn another process. The peel, pulp, and seeds are used for cattle feed, or exported to be used in other orange drink products.

Writing Activity: After a brief review and question-answer session, the actual writing process begins. The children are told they will be graded only on content, capital letters, and punctuation.

They are asked to write a paragraph describing the things which they have seen. They are also asked to use certain words in their writing, reflecting their comprehension of the words by their use in the paragraphs.

Sample Paragraph Assignment:

A) "How energy is used to turn oranges into orange concentrate."
B) "How energy is now wasted in processing Hardee County oranges."

These words will later be used in puzzles and sentence completions.

Paragraphs are marked with correct punctuation marks and capital letters. Positive remarks are made on the content of the paper. NO GRADE.

POST-WRITING Activities:

The papers are returned to students. They are asked to correct papers and prepare to read them aloud on a volunteer basis. Positive criticism will be offered by the group. The student will then rewrite the paper in order to gain a grade (additions may be made after hearing the comments of their peers).

The next day, the students are divided into groups and are asked to make up word searches, crossword puzzles, and sentence completions to be exchanged with the other groups. These "games" will be graded on the basis of term use and word content.

Some of the crossword puzzle entries will be used in the form of matching questions. Some of the sentence completions will be used as fill in the blank questions. However, other completions will be used as essays.

After being graded they are returned to the students and discussed. Students will select several of the best papers to be sent to the Manager of the American Orange Company, Wauchula, Florida, for his comments and reactions.

WRITING EDITORIALS ON ENERGY ISSUES

An editorial is an article of opinion rather than objective reporting of the facts of a story. The underlying purpose is to rally reader support for the writer's point of view or position.

Editorials come in four types:

A) Entertainment - to amuse readers by making fun or developing humorous ironies and paradoxes;
B) Commendation, appreciation, or tribute to persons or groups which deserve special recognition;
C) Information and interpretation - to inform readers and to help them understand complex issues; and
D) Argument and persuasion - to convince readers to accept a specific value judgment, point of view, or a position on a community event or public issue.

Have students study editorials of each type on local issues. Then, they should each write a brief editorial of each type on an energy topic. Example:

A) Homeowner Saves Energy, Only To Pay Higher Electric Bills
B) Superintendent Leads Hardee Schools To Lower Energy Costs
C) Energy Conservation Is Good Business: Car Pooling Saves Energy
D) Nuclear Energy Is Safe; Build Plants Now

WRITING A BRIEF NEWS STORY

News stories should be accurate, clear, and complete. News stories use an inverted pyramid style which begins with the most important information. Other facts are added in order of descending importance with the least important details at the end of the story.

Part of a news story:

A) Lead: introductory part (what? Who? Why? When? Where?).
B) Body: facts that add to the statement made in the lead.
C) Lesser details and quotations.

The teacher should ditto several brief energy news stories for class analysis on the inverted pyramid style and the parts of a news story. Then, students should be assigned brief news stories to write--which are of local importance.

EXAMPLES:

"Gas Prices Up In Wauchula"
"Grove Smudgepots Burn High Cost Energy"
"Electric Bills Up Again"
"Homeowners Let Energy Audits"
"Students Study Energy In Ag Courses"
"Local Industrial Arts Students Recondition Used Windmills"

WRITE FEATURE STORIES ON ENERGY

Newspapers use several types of feature stories. First, there are human interest features (appeals to the reader's emotions). Second, there are news features (containing a news worthy occurence linked to an unusual aspect on human interest appeal). And, third, there are personality features (presenting the accomplishments or activities of people).

Teacher should have students examine one example of each kind of feature: human interest, news, and personality features.

Then, students might be assigned to write brief examples of each type feature. Sample topics include:

A) "Elderly Wauchulians Feel Energy Crunch"
"Too Dangerous? Hardee High Grad Serves on a Nuclear Sub"

B) "Gas Prices Up, But Hardee High Students Still Prefer Big Cars"
"Solar Energy Comes to Hardee Houses"

C) "I. M. Ready Guides Hardee Schools on Energy Savings"
"Ag Agent Always Ready To Help Local Farmers"
"Save It, Florida! Governor Graham Leads State Energy Conservation Effort"
"Fiddler on the Roof: George Webb Installs Solar Water Heaters"

ENERGY-ACTIVE IDEAS

--Brainstorm and invent solar energy or energy conservation slogans. Select the best and post in classrooms; send to the local newspaper; send to the Governor's Energy Office, The Capitol, Tallahassee, FL 32301; and use them in the school newspaper!
--Prepare an ad campaign to promote alternative energy and energy conservation on TV, radio, and in magazines and newspapers. Have ads tailored to particular audiences, based on viewing time, typical subscribers, etc.
--Create a photo-essay from magazine photos or original photos that reveals the sun in all its aspects (different times of day or year, different weather conditions, reflected off of water or shining through leaves, in windows, etc.).
--Do a series of articles for the school paper on forms of alternative energy: solar (active and passive), wind, ocean thermal, wood, methane, gasohol, mariculture, hydropower, photovoltaics, solar power satellite, stirling engines.
--Make energy posters, collages, or magazine montages, with an energy theme.
--Write news articles about local builders, businesspersons, homeowners, etc., who are "going solar" or who are staffing a recycling center or providing other energy-saving services.
--Debate what the government's policy on energy should: laissez faire, general subsidy, selective subsidies, energy imperialism?
--Produce a booklet of tips for using alternative energy and saving conventional energy, for distribution at school PTA meetings. (For information

write to the U.S. Department of Energy, Technical Information Center, PO Box 62, Oak Ridge, TN 37830 and the National Solar Heating and Cooling Information Center, PO Box 1607, Rockville, MD 20850.)

--Learn the important words relating to energy and use them to make a word puzzle for the class.

--Write local history focusing on changes in energy use: heating, dress, cooking, transportation, use of renewable vs. non-renewable energy.

--Bring a series of energy-saving proposals to the school administration with a plan for implementing them.

--Put together a newspaper "front page" of newspaper clippings that relate to energy from a variety of perspectives: International, environmental, political, human interest, economic, etc.

--Use solar, wind, hydro, or other forms of alternative energy as report or term paper topics.

--Follow a particular local energy controversy in the newspapers through the year. Make a scrapbook or file of all information collected. Encourage students to attend hearings, write letters, invite speakers, and debate the issues.

Energy Information Sources

Compiled by the
Public Information Office
Florida Solar Energy Center
300 State Road 401, Cape Canaveral, Florida 32920
May 1980

Florida

1. **Florida Solar Energy Center**
   Address: FSEC Public Information Office, 300 State Road 401
   Cape Canaveral, FL 32920
   Phone: 305/783-0300
   - Publications (General and Technical)
   - Alternative Energy Library
   - Workshops and Short Courses
   - System Standards and Testing

2. **Governor's Energy Office**
   Address: GEO Energy Information Center, 301 Bryant Building
   Tallahassee, FL 32301
   Phone: 904/488-6143 or 488-6764
   - Policy Planning and Analysis
   - Conservation Programs
   - State Energy Allocation
   - Grant Programs

3. **Institute of Food and Agricultural Sciences**
   Address: IFAS/ Center for Environmental and Natural Resources Program
   3038 McCarty Hall/University of Florida
   Gainesville, FL 32611
   Phone: 904/392-1511 or 392-1915
   - Energy Extension Service
   - Research Activities
   - Publications/General Information

4. **Clean Energy Research Institute**
   Address: CERI/School of Engineering and Architecture
   University of Miami
   P.O. Box 248294, Coral Gables, FL 33124
   Phone: 305/284-4666
   - Workshops
   - Conferences and Symposiums
   - Research Activities

5. **District School Board of Pasco County**
   Address: Energy Management Center, P.O. Box 190
   Port Richey, FL 33568
   Phone: 813/848-4870 or 848-4881
   - Education Programs
   - Teacher Training
   - Student Field Trips
   - Publications

6. **Florida Conservation Foundation, Inc.**
   Address: Environmental Information Center, 935 Orange Avenue
   Winter Park, FL 32789
   Phone: 305/644-5377
   - Build Your Own Solar Water Heater ($)
   - Solar Heating for Swimming Pools ($)
   - General Information

7. **Florida Department of Agriculture and Consumer Services**
   Address: Division of Consumer Services, Mayo Building
   Tallahassee, FL 32304
   Phone: 1-800/342-2176
   - Consumer Protection Information
   - Consumer Handbook on Solar Systems

8. **International Association for Hydrogen Energy**
   Address: International Association for Hydrogen Energy
   University of Miami, P.O. Box 248266
   Coral Gables, FL 33124
   - International Journal of Hydrogen Energy
   - Publications
   - Workshops and Conferences

9. **NASA-Florida State Technology Applications Center**
   Address: STAC/College of Engineering
   500 Weil Hall, University of Florida
   Gainesville, 32611
   Phone: 904/392-6760
   - Computerized Information Searches ($)
   - Access to Major Data Bases
   - Document Marking Service

10. **Solar Energy and Energy Conversion Laboratory**
    Address: Solar Energy and Energy Conversion Laboratory
    MEB 325, University of Florida, Gainesville, FL 32611
    Phone: 904/392-0812
    - Research and Development
    - Product Analysis
    - Training Programs

11. **Tel-Consumer, Inc.**
    Address: Tel-Consumer, Inc.
    c/o Consumer Advocate, 140 West Flagler Street
    Miami, FL
    Phone: 1-800/432-6666 (Florida); 579-HELP (Dade County)
    - Recorded Messages on Energy, the Environment, Consumer Concerns

12. **U.S. Department of Agriculture**
    Address: Citrus and Subtropical Products Laboratory
    P.O. Box 1909, Winter Haven, FL 33880
    Phone: 813/293-4133
    - Solar Energy in Food Processing
    - Solar Grants Program

National

13. **National Solar Heating And Cooling Information Center**
    Address: Solar Heating, P.O. Box 1607
    Rockville, MD 20850
    Phone: 1-800/523-2929
    - Information on Solar Applications (Domestic Hot Water, Heating, Cooling)
    - Information on Solar Demonstration Grants
    - Lists (by State) of Solar Professionals, Speakers, Industry, etc.
    - Travelling Solar Exhibits

    Address: Solar Film Library
    The Chilton Company, One Chilton Way
    Radnor, PA 19089
    Phone: 215/687-8200
    - Solar Films (Free Loans)

energy information sources (continued)

National (continued)

14. Solar Energy Research Institute
Address: SERI Information Center, 1617 Cole Boulevard
Golden, CO 80401
Phone: 303/231-1000
- Information on Solar Technologies (Photovoltaics, Biomass, Wind, Solar Thermal, Industrial Process Heat)
- Alcohol Fuels Information Center (1-800/525-5555)
- Solar Energy Information Data Bank (SEIDB)
- Solar Energy Information Locator Booklet

15. Southern Solar Energy Center
Address: SSEC Information Services, 61 Perimeter Park
Atlanta, GA 30341
Phone: 404/458-8765

16. Center for Renewable Resources
Address: Center for Renewable Resources
1028 Connecticut Avenue, NW
Washington, DC 20036
Phone: 202/466-6880 or 642-1009
- Solar and Conservation Surveys and Studies
- Solar Legislative Issues

17. Citizen's Energy Project
Address: Citizen's Energy Project
1110 Sixth Street, NW
Washington, DC 20001
Phone: 202/387-8998
- Citizen's Energy Directory ($)
- Alternative Energy Publications ($)
- Soft Solar Notes (Passive Solar Newsletter)

18. Department of Commerce
Address: National Technical Information Service (NTIS)
5285 Port Royal Road, Springfield, VA 22161
Phone: 703/557-4650
- Computerized Information Searches ($)
- Government Reports and Analyses ($)

19. Department of Energy
Address: DOE Energy Technology Center, Bartlesville, OK 74003
Phone: 918/336-2400, Ext. 258 or 316
- Alternate Fuels Data Bank
- Information on Fossil Fuels
- Fuel Storage Stability

Address: DOE Office of Consumer Affairs
Room 8E018, Washington, DC 20585
Phone: 202/252-5141
- Energy Consumer (Newsletter)

Address: DOE Technical Information Center (DOE-TIC)
Citizens Assistance Section
P.O. Box 62, Oak Ridge, TN 37830
Phone: 615/576-1304
- Publications (Energy Production, Use, Conservation)
- Classroom Materials
- Energy Film Library (Free Loans)

20. Energy Information Administration
Address: National Energy Information Center
1726 M Street, NW, Room 850 (EI-61)
Washington, DC 20461
Phone: 202/634-5694
- Statistical and Analytical Publications
- Data and Referral Assistance

21. Environmental Action Reprint Service
Address: EARS, 2239 East Colfax, Denver, CO 80206
Phone: 303/321-1645
- Solar Publications Catalog

22. Government Printing Office
Address: Superintendent of Documents,
Government Printing Office
Washington, DC 20402
Phone: 202/763-3238
- Statistical, Technical Publications ($)
- Solar Energy Bibliography
- National Solar Energy Education Directory ($)

23. National Center for Appropriate Technology
Address: NCAT
P.O. Box 3838, Butte, MT 59701
Phone: 406/494-4572
- Low-Income Community Grants Program
- Solutions to Community Energy Problems

24. National Oceanic and Atmospheric Administration
Address: National Climatic Center
Federal Building
Asheville, NC 28801
Phone: 704/258-2850, Ext. 683
- Monthly Summary Solar Radiation Data ($)
- SOLDAY/SOLMET Users Guides, Reference Manuals

25. National Science Teachers Association
Address: NSTA, 1742 Connecticut Avenue, NW
Washington, DC 20009
- Classroom Materials

26. President's Clearinghouse for Community Energy Efficiency
Address: President's Clearinghouse
400 North Capitol Street, NW, Suite 185
Washington, DC 20001
Phone: 1-800/424-9040
- Assistance for Local Governments
- Information on Community Grant Programs

27. Public Documents Distribution Center
Address: Consumer Information Center
Pueblo, CO 81002
Phone: 303/544-5277, Ext. 370
- Consumer Information Catalog

28. Solar Energy Industries Association
Address: SEIA, 1001 Connecticut Avenue, NW, Suite 800
Washington, DC 20036
Phone: 202/293-2981
- Seminars and Trade Shows
- Education
- Legislative Updates
- Newsletters

Agriculture & Home Economics Dept.
Cooperative Extension Service
P. O. Box 50
Bartow, Florida 33830